The Mountain Pine Beetle Initiative

PRIVATE FORESTLANDS REHABILITATION PROGRAM

Operational Guidelines and Funding Application Form

Natural Resources Canada | Ressources naturelles Canada

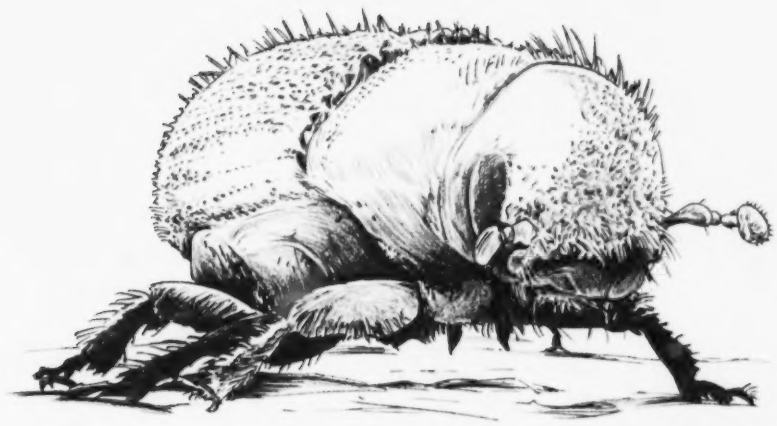
Canada

The Mountain Pine Beetle Initiative

PRIVATE FORESTLANDS REHABILITATION PROGRAM

Operational Guidelines and Funding Application Form

May 2003



103-06060/

The Mountain Pine Beetle Initiative

The *Mountain Pine Beetle Initiative* is a federal government response to the mountain pine beetle epidemic in British Columbia (BC). One of the programs under the Initiative, the *Private Forestlands Rehabilitation Program* (*PFRP*), is designed to assist private landowners in early mountain pine beetle control efforts and rehabilitation of mountain pine beetle infested forestlands.

The *Operational Guidelines* provide information on the epidemic and describe the procedures for participating in the *PFRP*. They outline the operational guidelines of the program and contain an application form for developing a project proposal and applying for assistance. Through the *PFRP* landowners can obtain technical and funding assistance for activities relating to mountain pine beetle management, control, and rehabilitation on non-industrial private lands.

Additional copies of the *Operational Guidelines* and further information about the *PFRP* can be obtained from the Canadian Forest Service at the following address:

Natural Resources Canada, Canadian Forest Service
Private Forestlands Rehabilitation Program
506 West Burnside Road
Victoria, BC V8Z 1M5
Attention: Nello Cataldo, Program Manager
Telephone: (250) 363-6014 Fax: (250) 363-0775
Email: ncataldo@pfc.cfs.nrcan.gc.ca

http://mpb.cfs.nrcan.gc.ca

Copies of these guidelines and advice and information on the *PFRP* can also be obtained from Canadian Forest Service field staff at the following locations:

Prince George, B.C.

Attention: Helena Adamowicz
Telephone: (250) 960-5691
Fax: (250) 960-5767
Email: headamow@pfc.cfs.nrcan.gc.ca

Kamloops, B.C.

Attention: Maureen Scott
Telephone: (250) 371-3949
Fax: (250) 371-3714
Email: mascott@pfc.cfs.nrcan.gc.ca

Please read these guidelines carefully before completing the Funding Application Form. Completed applications should be submitted to the Canadian Forest Service in Victoria at the address above. Applications for funding will be accepted on a continuous basis. Applicants will receive acknowledgement of receipt of their application.

May 2003

Table of Contents

Preface 1
The *Mountain Pine Beetle Initiative* 2
Introduction 2
The *Private Forestlands Rehabilitation Program* 4
Mountain Pine Beetle in BC 4
Status of the mountain pine beetle in BC 5
Impact of the current mountain pine beetle outbreak 5
Mountain pine beetle biology – in brief 6
Mountain pine beetle infestation dynamics 8
Effective mountain pine beetle management 9
The Lead Role of the British Columbia Government 10
Provincial bark beetle management categories 10
Aggressive management 10
Containment 10
Salvage/limited activity 11
Beetle Management Units 12
Provincial bark beetle management strategies 12
Suppression 13
Holding 13
Salvage 14
Monitor 15
The *Private Forestlands Rehabilitation Program* 15
Purpose and objectives 15
Program participation 16
Program funding 17
What activities are eligible for *PFRP* funding? 17
Other eligible activities 25
How much funding may be received? 26
What is not eligible for funding under the *PFRP*? 27
Other ineligible activities and expenses include 28
Application process 28
The Contribution Agreement 28
Recipient commitment and financial records 29
Payment 29
Project inspections and monitoring 30
Technical Advisory Committee 30
Glossary 31
Resources 34

Funding Application Form A-1
1. Introduction A-3
2. Assistance with the Funding Application Form A-4
3. Applicant Information A-5
4. General Property Information A-6
5. Project Information A-7
6. Project Description A-8
7. Proposed Activity Details A-10
8. Project Budget Summary A-17
9. Applicant Signature Block A-18

Preface

A massive outbreak of the mountain pine beetle through most of the lodgepole pine forests of British Columbia (BC) is currently (2002) destroying millions of cubic metres of mature lodgepole pine over an area millions of hectares in size.

Although the forests of BC are host to a variety of bark beetles, the mountain pine beetle is the focus of the *Mountain Pine Beetle Initiative* and the *Private Forestlands Rehabilitation Program* under the Initiative.

The purpose of the *Operational Guidelines* is to provide some background information on the mountain pine beetle epidemic in BC, and to explain eligibility and the application procedure to those who wish to become part of the *Mountain Pine Beetle Initiative*. The guidelines are divided into five parts.

- The first part provides background information of the *Mountain Pine Beetle Initiative* and suggestions for finding additional information.
- The second part provides an introduction to the mountain pine beetle in BC, the status and impacts, and describes mountain pine beetle biology, infestation dynamics, and management.
- The third part consists of an overview of the Provincial Strategy for bark beetle management.
- The fourth part contains the guidelines for the *Private Forestlands Rehabilitation Program* and describes the procedures for participating in the program.
- The fifth part contains a glossary of terms, references, and the Funding Application Form for applying to the program.

The Mountain Pine Beetle Initiative

Introduction

In early October 2002 the Government of Canada announced a $246.5 million funding package to support softwood lumber workers and communities. Among a range of measures included is a five year, $40 million program to address the mountain pine beetle epidemic in BC. The *Mountain Pine Beetle Initiative* was developed as a partnership among departments of the federal government, the BC government, national research institutes, First Nations, and industry. The Initiative was designed to complement provincial government efforts in response to the epidemic. The Initiative focuses on providing research to quantify the impacts and to reduce the risk of future mountain pine beetle epidemics, and also focuses on the rehabilitation of federal and private (non-industrial) forestlands affected by the beetle. The Canadian Forest Service Pacific Forestry Centre will lead the *Mountain Pine Beetle Initiative*.

The five-year research agenda is designed to answer forestland management questions. In the short term, dealing with the current epidemic and getting the best value from affected forests is critical. Looking ahead, research is needed to quantify the economic and ecological impacts of beetle infestations, and to develop options to respond to infestations, including options to reduce the risk of future epidemics.

The *Federal Forestlands Rehabilitation Program* will address mountain pine beetle impacts in National Parks, First Nations reserve lands and military and other federal forestlands in cooperation with Parks Canada, Indian and Northern Affairs Canada, and the Department of National Defence. The focus will be on containment of the infestation in parks; on control, rehabilitation and forest management capacity in First Nations reserves; and on forest rehabilitation on military lands.

The *PFRP* will target private, non-industrial landowners. These landowners will be encouraged to participate in efforts to deal with the beetle through early identification and intervention as well as the clean up of those forest stands already infected.

Endemic in lodgepole pine stands throughout western North America, the mountain pine beetle is normally limited to highly stressed trees within the pine forest ecosystem. However when the right circumstances align, such as large areas of over mature pine and several years of warm winters, outbreaks make it the most destructive insect pest of mature pine forests.

Mountain pine beetles normally attack mature or weakened lodgepole pine (80 years old or older). They lay eggs under the bark, and when larvae feed on the inner bark of the tree they cut off the supply of water and nutrients. The beetles introduce a bluestain fungus that holds back a tree's natural defences against the attack by killing living cells in the inner bark and sapwood. The larvae and fungus combination girdles (kills) most attacked trees. The fungus also discolours the sapwood of the trees and devalues the wood. If beetle infested trees are harvested within two or three years of attack, they retain most of their economic value.

It takes a number of years for an outbreak to develop. The current outbreak (2002) in central interior BC is a product the following three conditions:

1. a landscape with an abundance of susceptible trees;
2. sustained favourable weather; and,
3. a lack of effective control action during the outbreak's incipient stage.

A winter low of -40°C or a sudden cold snap in early fall or late spring of -25°C would reduce beetle populations enough to end the outbreak.

The mountain pine beetle infestation in the west-central interior of BC has been present for approximately 10 years but has increased rapidly in recent years to become the largest in BC's history. The potential impact of the mountain pine beetle infestation is estimated at $4.03 billion in lost lumber alone, or 34% of the total value of Canadian softwood production in 2000/01.

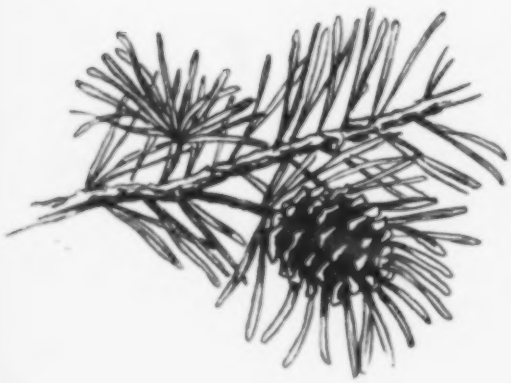
Further information on the mountain pine beetle epidemic and research at the Pacific Forestry Centre can be found at:

http://www.pfc.cfs.nrcan.gc.ca/entomology/mpb/index_e.html

The response of the BC Provincial Government to the mountain pine beetle epidemic can be found at:

http://www.for.gov.bc.ca/PAB/News/Features/beetles/index.htm

The Private Forestlands Rehabilitation Program



Lodgepole Pine

The *Mountain Pine Beetle Initiative* includes a component to assist private landowners with controlling and minimizing the impact of the current mountain pine beetle epidemic on non-industrial private lands. This component, the *Private Forestlands Rehabilitation Program*, is designed to help private landowners in early mountain pine beetle control efforts and rehabilitation of mountain pine beetle infested forestlands.

The program is specific to non-industrial private landowners and is delivered on a cost-shared basis and in cooperation with landowners and woodlot owner organizations.

Overall management of the program is the responsibility of Natural Resources Canada, Canadian Forest Service. A program Technical Advisory Committee with representation from the federal and provincial governments and woodlot owners organizations will provide support in program promotion, soliciting proposals, recommending projects, and assisting with extension activities as required.

Mountain Pine Beetle in British Columbia

The mountain pine beetle, *Dendroctonus ponderosae* Hopkins, is a member of the group of insects known as bark beetles. Most bark beetles cause little or no economic damage, normally infesting branches, stumps, and stems of standing dead or severely weakened trees or material found on the forest floor. Under certain conditions, a few species of bark beetles become the most damaging insects found in the mature forests of BC. Catastrophic losses can result from outbreaks of the mountain pine beetle, spruce beetle, Douglas-fir beetle, and the western balsam bark beetle. These beetles are closely related and can be difficult to tell apart without a detailed knowledge of insect anatomy. However, they can be distinguished by their size, the tree species they inhabit, and differences in timing and duration of their life cycles.

The mountain pine beetle, Dendroctonus ponderosae Hopkins

- Mountain pine beetle: generally has a one-year life cycle and attacks all species of native pines from mid July to mid August. Most of the damage occurs in lodgepole pine, ponderosa pine, and white pine trees.
- Spruce beetle: generally has a two-year life cycle and attacks Englemann spruce, white spruce, and sitka spruce trees from late April to early June.
- Douglas-fir beetle: generally has a one-year life cycle and attacks Douglas-fir trees from late April through May.
- Western Balsam bark beetle: generally has a one- to two-year life cycle and attacks primarily subalpine fir in mid-summer.

The mountain pine beetle is the focus of the *Mountain Pine Beetle Initiative*.

Status of the mountain pine beetle in British Columbia

The current outbreak of mountain pine beetle in BC is the largest that Canada has ever seen. At over 1.46 million hectares of trees that are infested the outbreak is possibly the largest ever in North America. Figure 1 depicts the approximate location of infestations, based on aerial overview surveys conducted in the late summer and early fall of 2002.

Impact of the current mountain pine beetle outbreak

The current outbreak stretches from Fort St. James some 1100 kilometres south to Cranbrook and the Rocky Mountains, and affects many large and small communities in numerous ways. The most noticeable are the immediate adjustments to timber harvesting patterns. Timber harvesting has been directed into mountain pine beetle infested stands as both a control measure and as a means to maximize the value of the timber that has been killed by the beetle. The Annual Allowable Cut has been increased in three areas by the Chief Forester of BC by a total of 5.4 million cubic metres so that maximum harvesting power can be concentrated on the areas of heaviest attack. In the long term, however, harvesting and processing will be adjusted after the mountain pine beetle infestations subside. The current infestation will have an impact on thousands of British Columbians who depend on the sustainable harvest and management of lodgepole pine.

Figure 1. Approximate location (in red) of mountain pine beetle infestations in British Columbia in 2002 (BC Ministry of Forests, 2002)

The economics of harvesting are severely compromised in stands where, as is often the case, not all of the trees in the stand are killed. While a significant proportion of living trees may remain in an attacked stand, the component of dead trees in the harvest mix will often dramatically reduce the stand value. The mountain pine beetle also prefers to attack and kill the largest trees in a stand – the very same trees that are most attractive and valuable to the milling facilities. Lumber from dead lodgepole pine may be more difficult to sell on a very competitive market because of a bluestain fungus introduced into the tree by the beetles.

Harvesting may be necessary to remove susceptible and/or attacked trees

Many other forest values can be affected by mountain pine beetle infestations and outbreaks:

- landscape aesthetics can be marred by the large areas of dead lodgepole pine forests;
- watershed quality may be affected by large areas of dead lodgepole pine forests;
- wildlife habitat will change as the mature lodgepole pine trees die and are, over time, replaced by new forests;
- Annual Allowable Cuts may require downward adjustment in future years to compensate for scarcity of mature timber;
- property values may decline where significant lodgepole pine stands have been impacted; and,
- high-intensity fires and loss of investment are more likely.

Mountain pine beetle biology – in brief

The mountain pine beetle is a small, dark-coloured, cylindrical beetle, about the size of a grain of rice. It attacks and kills standing, living, lodgepole pine trees. It generally completes its life cycle in one year (Figure 2). In mid-summer, large numbers of adult female beetles attack new trees by boring through the bark to the sapwood. They construct vertical galleries in the phloem between the bark and the sapwood where, after the males join them, they mate and the females deposit their eggs. These eggs hatch into legless larvae that feed outwards from the vertical galleries on the phloem tissue of the host tree.

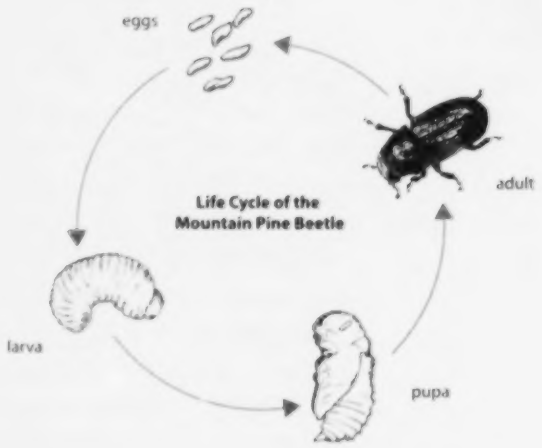
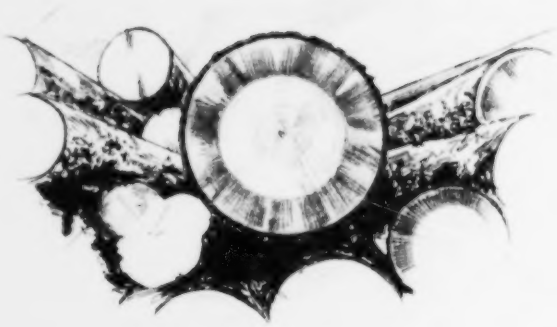


Figure 2. Life cycle of the mountain pine beetle.

The beetles introduce a bluestain fungus into the sapwood of the tree that prevents the tree from repelling and killing the attacking beetles with pitch flow. It also blocks water and nutrient translocation within the tree. The joint action of larval feeding and fungal colonization kills the host tree within a few weeks of successful attack (the fungus and feeding by the larvae girdles the tree cutting off the flow of water and nutrients). The larvae continue their development under the bark over winter, turn into a transformation stage called pupae next spring, and finally emerge to fly and attack new host trees in the summer following the initial attack.



The mountain pine beetles introduce a blue-staining fungus into the sapwood which can be seen in cut timber.

Foliage symptoms of attacked lodgepole pine trees generally are not obvious until shortly before the mature adult beetles fly from the tree in the summer following attack. However, in some conditions, a slight lightening of the foliage can be seen in the spring preceding adult flight. These trees are commonly known as 'faders' and can yield visual clues regarding the extent of the infestation. In the summer of adult flight, the attacked trees will hold bright red foliage – it is these trees that are mapped in aerial overview surveys. The foliage will fade to a dull red in the second year following attack. Generally very little foliage will remain on the tree three or four years after the attack. The trees, called 'grey attack,' will resemble grey skeletons.

At low (endemic) populations the mountain pine beetle survives in weakened or stressed trees. As populations increase or more trees become stressed because of drought or other causes, the population may quickly increase and spread. Healthy trees are then attacked and huge areas of mature pine stands may be threatened or killed. Warm summers and mild winters play a role in both insect survival and the continuation and intensification of an outbreak. Adverse weather conditions (winter low of -40°C, high winds during dispersal period) can reduce the beetle populations and slow the spread, but the insects can recover quickly and resume their attack on otherwise healthy forests.

The current outbreak is progressing as one might expect, considering the relatively mild winters that have been experienced since the mid 1980s and the generally favourable (to mountain pine beetle development) summer weather patterns. The outbreak is likely to continue until an early cold winter kills overwintering larvae. In fact, it was two back-to-back unseasonably cold fall periods in 1984 and 1985 that caused the collapse of the Cariboo-Chilcotin outbreak. In both of those years, early sustained temperatures in the –30 to –40°C were experienced.

Mountain pine beetle infestation dynamics

It is important to understand the dynamics of an infestation so that the various techniques that are available to manage the mountain pine beetle are applied properly.

There are four main stages in the life of a mountain pine beetle infestation: endemic, incipient, outbreak, and collapse.

- In an endemic population beetles exist in single trees that are generally in a weakened state or are very old. They maintain their population until conditions favour an outbreak.
- In an incipient population, beetle numbers exceed the minimum size necessary to overcome the resistance of the average large-diameter tree in the stand. This build-up can occur because of an increase in brood survival or a reduction in tree resistance – both generally brought about by changing weather conditions. In this stage infestations are scattered throughout individual stands and clumps of infested trees increase over time.
- In an outbreak or epidemic stage local populations expand and attacking adult beetles disperse widely. Beetle populations thrive at the landscape level. Key factors in reaching this stage are sustained weather conditions that favour beetle production and an abundance of susceptible host trees. Outbreak populations are able to overcome conditions that would normally cause mortality, and can even rebound after a large-scale mortality event such as one early cold winter.
- An outbreak collapse is brought about most often by weather conditions that are unfavourable to the mountain pine beetle. The reduction in susceptible host material will also make it difficult to maintain high beetle numbers.

Figure 3. Outbreak cycle of the mountain pine beetle.

Control activities will only produce desirable results when applied at the proper stage in the outbreak chronology.

Mountain pine beetle infestation dynamics

It is important to understand the dynamics of an infestation so that the various techniques that are available to manage the mountain pine beetle are applied properly.

There are four main stages in the life of a mountain pine beetle infestation: endemic, incipient, outbreak, and collapse.

- In an endemic population beetles exist in single trees that are generally in a weakened state or are very old. They maintain their population until conditions favour an outbreak.
- In an incipient population, beetle numbers exceed the minimum size necessary to overcome the resistance of the average large-diameter tree in the stand. This build-up can occur because of an increase in brood survival or a reduction in tree resistance – both generally brought about by changing weather conditions. In this stage infestations are scattered throughout individual stands and clumps of infested trees increase over time.
- In an outbreak or epidemic stage local populations expand and attacking adult beetles disperse widely. Beetle populations thrive at the landscape level. Key factors in reaching this stage are sustained weather conditions that favour beetle production and an abundance of susceptible host trees. Outbreak populations are able to overcome conditions that would normally cause mortality, and can even rebound after a large-scale mortality event such as one early cold winter.
- An outbreak collapse is brought about most often by weather conditions that are unfavourable to the mountain pine beetle. The reduction in susceptible host material will also make it difficult to maintain high beetle numbers.

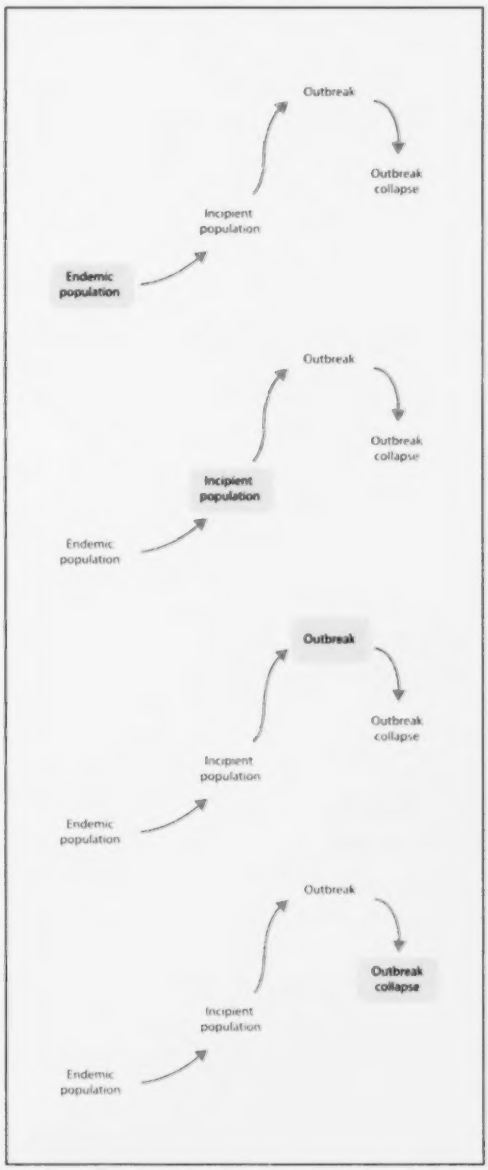


Figure 3. Outbreak cycle of the mountain pine beetle.

Control activities will only produce desirable results when applied at the proper stage in the outbreak chronology.

Effective mountain pine beetle management

To be effective mountain pine beetle management requires two elements: prevention and direct control.

The cause of landscape-level outbreaks is an overabundance of susceptible stands and trees (i.e. large contiguous areas of susceptible forest). Therefore, the long-term solution is prevention of an outbreak by managing the host lodgepole pine to avoid conditions that are conducive to population build-up. Prevention techniques include management at shortened rotations, establishment of age and species mosaics at the landscape level, stand type conversion, and spacing of mature pine stands to increase vigour and resistance to beetle attack.

However, outbreaks will occur and they must be addressed with efficient and timely control strategies and techniques. Effective direct control programs are based on early detection, early implementation, and consistent application. Early intervention will avoid catastrophic losses in most cases.

Annual detection surveys are a key first step in the effort to control mountain pine beetles

Success in suppressing infestations depends on the strategies and tactics employed, the effort expended on control, and the point in the outbreak cycle where control is initiated. Some key elements of effective bark beetle management at the landscape level include:

- rating stands for susceptibility and risk;
- annual detection surveys and mapping of infestations;
- annual assessments of rates of change in infestation levels and spread; and,
- prompt, appropriate and thorough action on all infestations where suppression or control is feasible to some degree.

Continuity of management effort from one year to the next is necessary to ensure that investments are not wasted. Consistency of management effort between adjacent management units is critical to success in each. It is also necessary to recognize where and when certain management actions would not be appropriate so that scarce resources are not wasted.

The Lead Role of the British Columbia Government

The mountain pine beetle should be managed throughout the province in a consistent manner, guided by an overriding strategy, irrespective of land ownership or administrative boundaries. In this way, management activities will complement each other and be most effective.

The BC Ministry of Forests has the responsibility to direct and lead the management of mountain pine beetle activities on provincial crown land. A Provincial Strategy for Bark Beetle Management has been developed to respond to the status of the various bark beetles inhabiting the province. The Provincial Strategy for Bark Beetle Management forms the basis of these guidelines.

Provincial bark beetle management categories

There are three provincial bark beetle management categories, each reflecting a different level of infestation and a corresponding level of management. The distribution of each management category within a forest district or forest region will depend upon the current state of the infestation, susceptible host types remaining, and resources available. Management categories include aggressive management, containment, and salvage/limited activity.

Aggressive management

Areas that are at high risk of attack need to be closely monitored for beetle infestation and require appropriate management strategies. When mountain pine beetles are first noticed in a stand, aggressive management strategies should be considered to control the beetle and to reduce its spread.

Areas suitable for aggressive management are characterized by a few large infestations and a low patch to spot ratio (i.e., many more spot infestations than patch infestations). Such areas are either on the leading edge of expanding large outbreaks or are new individual infestations. The level of grey attack in the stands is nil to low and red attack is low. The green attack level is low to moderate and high amounts of hazard stands susceptible to attack remain uninfested.

Containment

Areas where containment action is appropriate are characterized by an intensification of the beetle populations in the two years following the initial attacks. Rapidly increasing red attack,

apparent in increased spotting and coalescing of spots into larger patches, is evident in these areas where the infestation is gathering momentum. The outbreak has grown to where there are more patches than spot infestations. The amount of green attack has increased, from a low to moderate level to a moderate to high level, and the amount of grey attack has increased from nil to low levels to moderate levels. The percentage of stands remaining susceptible to attack has been reduced as the infestation increases in size, from a high level to a moderate level.

Salvage/Limited activity

Typically, infestations in salvage / limited activity areas would be at least three years old and often closer to five years old. Following this length of an outbreak, control options are diminished as the infestation has grown and large contiguous areas of mortality exist in the area. The patch to spot ratio and the level of grey attack in these areas has increased from moderate to high levels and the level of red and green attack has reduced from moderate to high levels to a low level. Very few stands in the area remain susceptible to attack.

The infestation characteristics of the management categories are summarized in Table 1.

Table 1. Comparison of infestation characteristics within provincial bark beetle management categories (adapted from BC Ministry of Forests, 2003).

	Management Category		
Factor	**Aggressive Management**	**Containment**	**Salvage / Limited Activity**
Outbreak age	New infestation or leading edge	1 – 2 years	> 3 years
Patch: spot ratio	Low	Moderate	High
Level of grey attack	Nil to low	Moderate	High
Level of red attack	Low	Moderate to high	Low to moderate
Level of green attack	Low to moderate	Moderate to high	Low
% of susceptible stands remaining	High	Moderate	Nil to low

Beetle Management Units

Beetle Management Units (BMUs) are essential for developing management strategies to deal with the mountain pine beetle. They are planning and reporting units for operational beetle management on a provincial basis. BMUs identify areas where specific beetle management strategies can be applied.

Generally there will be a number of BMUs within a bark beetle management area to facilitate beetle management. The number of BMUs in any one management area will depend upon the spatial distribution and intensity of the infestation, the extent of stand depletion, and the availability of resources. Resource management objectives will normally be consistent across any single BMU. Strategies between adjacent BMUs should be complementary.

Not all BMUs within a beetle management area will employ the same management strategy, except in an aggressive management area where all BMUs will follow a suppression strategy.

Provincial bark beetle management strategies

Bark beetle management categories and BMU management strategies are developed by the regional and provincial forest entomology staff of the BC Forest Service following annual aerial overview surveys and an assessment of the effectiveness of ongoing management strategies. The strategies are reviewed for effectiveness and modified as necessary on an annual basis. The extent and distribution of a beetle infestation in an area determines the strategy that is selected, along with the resource management objectives and the expected beetle impacts on adjacent areas. Beetle management strategies are broad approaches that have specific objectives. Each strategy has various tactics or treatments that can be applied. Selection of the relevant strategy for a particular BMU is based on the extent and distribution of beetle infestations in the area.

Stripping away the bark of the tree may reveal identifiable beetle 'galleries' in the cambium layer.

The current BMU map and associated management strategies can be viewed on the BC Ministry of Forests website at: **http://www.for.gov.bc.ca/hfp/bark_beetles/**. The six provincial bark beetle management strategies are

Prevention (long-term), *Suppression*, *Maintain Low*, *Holding Action*, *Salvage*, and *Monitor*. The four strategies that are more applicable to the *PFRP* are *Suppression*, *Holding*, *Salvage* and *Monitor*.

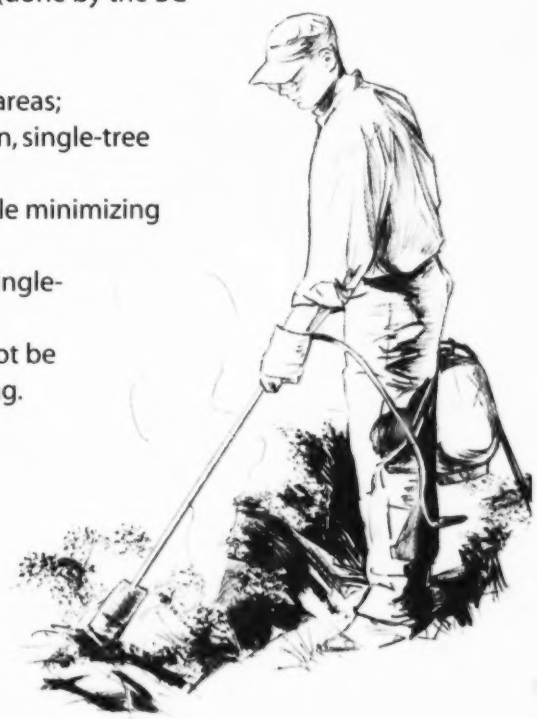
Suppression

Suppression is the most aggressive management strategy, and it is chosen when the infestation status is at a level where it is expected that aggressive direct control actions will keep the infestations at a low level.

Suppression areas will have incipient populations (pre-epidemic) and be very lightly infested, with spots of red attack trees showing. There will be no, or very few, patch infestations.

Tactics that would be appropriate under *Suppression* would be:

- annual aerial overview and sketch mapping (done by the BC Ministry of Forests);
- hazard and risk rating of all pine stands;
- intensive ground probing of newly infested areas;
- single-tree treatments including fall and burn, single-tree harvesting, small patch logging, etc.
- aggressive harvesting of infested stands while minimizing the removal of uninfested trees;
- pheromone treatment in conjunction with single-tree treatment and any harvesting; and,
- spot or grid baiting in infestations that cannot be treated by single-tree treatment or harvesting.



Using a drip torch to burn infested wood debris is a single tree treatment tactic.

Holding

Areas designated as *Holding* will support a chronic infestation that is too large to address with single-tree treatment. Often, access is not established to the area but is expected shortly. An area could be designated as *Holding* where aggressive suppression would be appropriate but the area is rated at a lower priority than others and resources are limited.

The intent of this strategy is to maintain an outbreak at a relatively static level. It is a delaying strategy until adequate resources become available or access is established so that a more aggressive strategy can be employed.

Tactics that would be appropriate under *Holding* would be:

- annual aerial overview and sketch mapping (done by the BC Ministry of Forests);
- hazard and risk rating of all pine stands;
- intensive ground probing of newly infested areas;
- single tree treatments, including fall and burn, single tree harvesting, small patch logging, etc.
- pheromone treatment in conjunction with single tree treatment and any harvesting; and,
- spot or grid baiting in infestations that cannot be treated by single tree treatment or harvesting.

Pheromone baiting is a tactic used in conjunction with single tree treatments.

Salvage

This strategy is applied to areas where there have been extensive outbreaks and where management efforts would be ineffective in reducing beetle populations and damage. Access and harvest of the dead trees should be in place or be planned within a five-year timeframe.

Areas designated as *Salvage* will be extensively infested with high proportions of red and grey attack. Harvesting will do very little to decrease the population levels but will remove timber while it still has some value in the marketplace and will allow sites to be reforested.

Tactics that would be appropriate under *Salvage* would be:

- annual overview sketch mapping (done by the BC Ministry of Forests);
- limited single-tree treatment at the periphery to limit beetle spread to adjacent areas that may have more aggressive strategies;
- development of criteria to establish salvage priorities;
- salvage of timber, consistent with the management plan, if harvest capacity exists;
- pheromone baiting of harvested stands that are adjacent to areas that have more aggressive strategies; and,
- restoration and rehabilitation of sites that have undergone salvage operations.

Monitor

This strategy, similar to *Salvage*, is applied to areas where management efforts would be ineffective in reducing beetle populations and damage. However, the *Monitor* strategy is employed where there is no possibility of salvaging the dead trees within five years or where other management objectives preclude actively addressing the beetle populations.

Tactics that would be appropriate under *Monitor* include:

- annual overview sketch mapping (done by the BC Ministry of Forests);
- development of a long-term management plan that considers the dead timber, including access planning;
- salvage of dead timber as resource objectives, wood quality and harvest capacity permit; and,
- rehabilitation of areas designated for timber production.

The Private Forestlands Rehabilitation Program

Purpose and objectives

Through the *Private Forestlands Rehabilitation Program* (*PFRP*) landowners can receive financial and technical assistance in planning, management, and control efforts associated with the mountain pine beetle epidemic in BC.

The purpose of the *PFRP* is to assist landowners in early mountain pine beetle control efforts and rehabilitation of mountain pine beetle infested areas on private forestlands.

The objectives of the program are:

i) to assist landowners to control and reduce the spread of the mountain pine beetle on private forestlands;
ii) to assist landowners to manage and rehabilitate private forestlands affected by the mountain pine beetle; and,
iii) to enhance private landowner understanding and knowledge of mountain pine beetle control and sustainable forest management.

The *PFRP* is specific to non-industrial private landowners and will be managed in cooperation with private landowners and woodlot associations. The *PFRP* is to be cost-shared with landowners contributing a minimum of 20% of total project costs. For the purpose of this

program, non-industrial forestland refers to lands that are between 10 and 2000 hectares in size.

Overall management of the *PFRP* is the responsibility of Natural Resources Canada Canadian Forest Service, with support from a program Technical Advisory Committee comprised of representatives from federal and provincial governments as well as private landowners and woodlot owner organizations.

Falling, bucking, and burning infested trees that contain live beetle brood is a control tactic.

Program participation

The *PFRP* is directed toward owners of private land in BC that meet the following requirements:

- an individual, a family, a partnership, a society, or a small business (collectively called private landowners);
- a private landowner with legal title to a parcel of non-industrial forestland in BC where the main focus, or potential use, is forest management;
- a private landowner who holds the legal authority (power of attorney) to make decisions regarding the property;
- a property that consists of a minimum of 10 contiguous hectares of productive forestland; and,
- a property that falls within the area affected by the mountain pine beetle.

Note: Private landowners who have more than 2000 hectares of land in one or more parcels are normally ineligible for funding, but they may apply and be considered.

Woodlot Licence private land (Schedule A) and private land classified as "Managed Forest" may be eligible for funding if the proposed activity is not subject to a legally enforceable commitment made in a Forest Management Plan or any other document. The Canadian Forest Service may request a copy of the management plan or licence document that outlines the licensee's forest health obligations to confirm the activity's eligibility.

Ineligible land includes:

- provincial crown land;
- municipal lands including regional districts;
- industrial private land (industrial forest licensees); and,
- private land that is not used, or does not have the potential, for forest management.

Program funding

What activities are eligible for PFRP funding?

The mountain pine beetle may affect forestlands managed by the owners of non-industrial private land in many ways. Management activities directed to mitigate the impact of the mountain pine beetle, in both the short term and the long term, may be eligible for funding under the *PFRP*.

The eligibility of any of the activities that are listed below may vary depending upon the Beetle Management Unit in which the subject land is located. Table 2 shows a listing and brief description of many of the eligible activities.

To use Table 2, follow these steps:

1. Locate the project area on the BMU map (BC MOF website).
2. Determine the management strategy for the BMU (BC MOF website).
3. Use the "BMU Management Strategy" column in this table to locate activities ("activity" column) that are acceptable for funding in the BMU.

Where management strategies are enclosed in parentheses, the indicated activity may be eligible for funding in that Beetle Management Unit at the discretion of the *PFRP*.

Table 2. Descriptions and applicability of eligible activities under the PFRP.

Mountain pine beetle management strategies and reports	
BMU Management Strategy: • suppression • holding • (salvage) 	**Description:** **Mountain pine beetle management strategies** should be developed and reports prepared, or existing forest management plans should be updated, to assess mountain pine beetle activities and treatments. Strategies or reports specifically focusing on mountain pine beetle management and control are developed to incorporate the treatment regimes proposed to mitigate the impact of the mountain pine beetle.

Program funding

What activities are eligible for PFRP funding?

The mountain pine beetle may affect forestlands managed by the owners of non-industrial private land in many ways. Management activities directed to mitigate the impact of the mountain pine beetle, in both the short term and the long term, may be eligible for funding under the *PFRP*.

The eligibility of any of the activities that are listed below may vary depending upon the Beetle Management Unit in which the subject land is located. Table 2 shows a listing and brief description of many of the eligible activities.

To use Table 2, follow these steps:

1. Locate the project area on the BMU map (BC MOF website).
2. Determine the management strategy for the BMU (BC MOF website).
3. Use the "BMU Management Strategy" column in this table to locate activities ("activity" column) that are acceptable for funding in the BMU.

Where management strategies are enclosed in parentheses, the indicated activity may be eligible for funding in that Beetle Management Unit at the discretion of the *PFRP*.

Table 2. Descriptions and applicability of eligible activities under the PFRP.

Mountain pine beetle management strategies and reports	
BMU Management Strategy: • suppression • holding • (salvage) 	**Description:** **Mountain pine beetle management strategies** should be developed and reports prepared, or existing forest management plans should be updated, to assess mountain pine beetle activities and treatments. Strategies or reports specifically focusing on mountain pine beetle management and control are developed to incorporate the treatment regimes proposed to mitigate the impact of the mountain pine beetle.

Surveys and prescriptions	
	Description: Areas under attack are examined on the ground to determine the extent of infestation so that action plans can be developed.
Ground Surveys	
BMU Management Strategy: • suppression • holding • salvage • monitor	**Ground surveys** (walkthroughs and probes) confirm information gathered from aerial surveys and collect data on levels of current (green) attack and amount of remaining susceptible trees. These surveys are best done in late August and September when beetle presence can be positively identified. Bole symptoms including pitch tubes, frass and boring dust identify fresh attack.
	Walkthroughs are non-systematic preliminary ground reconnaissance surveys done before probes are completed; they are the first surveys to be done in a stand. **Probes** are systematic, strip-type surveys done in an infested stand; they collect more detailed data than walkthroughs.
Treatment Surveys and Prescriptions	
BMU Management Strategy: • suppression • holding • salvage	**Treatment surveys and prescriptions** - stands that have been affected by the mountain pine beetle are evaluated for follow-up treatments. Areas needing treatment are identified and an appropriate treatment prescribed.

Direct and Indirect Control

Description:

Direct and indirect control activities aim at removing infested or susceptible trees or reducing the susceptibility of a stand or its attractiveness to the MPB.

Harvesting activities should be based on existing and future hazard and risk criteria. That is, stands with the highest hazard and closest to beetle population centres (high risk) should receive priority. Harvest priorities for beetle control will range from high, where beetles are active and the risk to adjacent stands is high, to low in the case of stands deemed as salvage.

Sanitation Harvesting

BMU Management Strategy:

- suppression
- holding
- (salvage)

Sanitation harvesting is the removal of single or groups of diseased or infested trees, or of susceptible trees, to reduce beetle population levels and to control the spread of the infestation to other areas. This practice is intended to remove currently infested trees and is the most efficient form of beetle management. Stands with the highest levels of new attack and with a high potential to spread should be given priority.

Salvage Harvesting

BMU Management Strategy:

- holding
- salvage

Salvage harvesting is the removal and processing of dead, dying or deteriorating timber before the wood has degraded below merchantability. This practice is not a beetle management tool; it does not reduce beetle population or stand susceptibility. Priorities for salvage cutting are determined on the basis of the levels of old attack and the age and quality of the timber.

Fall and Burn

BMU Management Strategy:

- suppression
- (holding)

Fall and Burn is the falling, bucking, piling, and burning of infested trees that contain live beetle brood to destroy that brood to prevent the spread of beetle populations to other areas.

This direct treatment is used to remove spots or patches of infested trees in lightly infested areas. Infested trees with red or green crowns that contain live beetle broods are felled and the infested portions of the tree is bucked, piled and burned ensuring that all infested bark area is well burned.

To ensure that the fire is hot enough to completely burn the bark of the green infested trees, often adjacent dead lodgepole pine from which beetles have already emerged are cut and used.

This activity is normally conducted in the winter, with snow on the ground, to minimize the chances of accidental fires.

Debarking

BMU Management Strategy:

- suppression
- (holding)

Debarking treatments (where attacked trees are felled and debarked) should be done from September through May and is not applicable once the beetle brood has passed the pupal stage.

The stumps of felled, infested trees from fall and burn and debarking activities must also be treated to ensure that live brood does not remain in the stump.

Beetle Proofing

BMU Management Strategy:

- suppression
- holding

Beetle proofing reduces the hazard of a particular stand or reducing its attractiveness to the beetles through partial cutting. Indirect measures (currently susceptible stands) include partial cutting and thinning mature pine stands to reduce the susceptibility to attack. Beetle proofing is applicable in areas with little or no active infestation. Not all stands are suitable and preplanning is critical.

Baiting

Description:

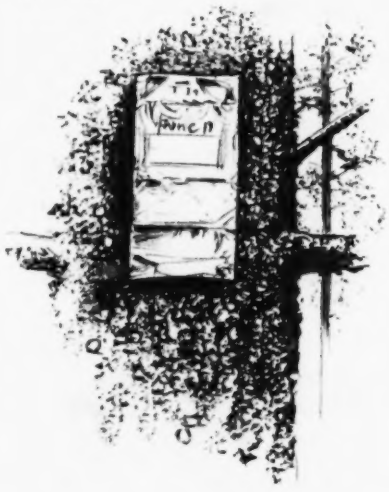
Baiting techniques are used to contain emerging beetles and prevent spread to adjacent susceptible stands.

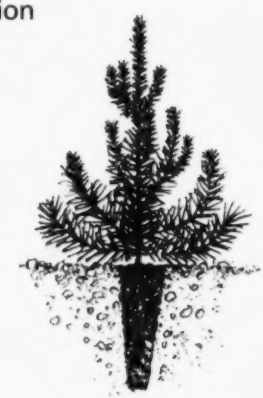
Pheromone Baiting

BMU Management Strategy:

- suppression
- holding

Pheromone baiting - luring beetles into trees baited with a lure made of an attractive or repellent chemical scent that mimics the scent that beetles produce once they have entered a tree **(must be done in conjunction with tree removal or burning)**. This technique helps concentrate the beetles in a single area where they **must** then be destroyed by falling and burning.

Pheromone Acquisition	
BMU Management Strategy: • suppression • holding 	**Pheromone acquisition** - purchase of pheromones that are generally accepted for use in mountain pine beetle management in BC. **Note: Only under special circumstances and under certain conditions will baiting techniques be considered.** A Forest Health Management Report and Bait Use Strategy completed by a qualified registered professional **must** be submitted before this activity will be considered. **The use of baits must always be followed by actions to remove or eradicate the concentrated beetle populations.** Baits will intensify bark beetle populations and losses will increase if bait use is not followed by remedial action such as harvesting or tree removal. **The use of baits in inaccessible areas will not be eligible.**
Site Restoration and Rehabilitation	
	Description: Sites that are under attack or that have been heavily attacked by mountain pine beetle may require restoration (*e.g.*- removal of large dead trees so that a regenerating forest will have a reasonable chance of becoming established or removing green attack trees or dead trees and cleaning the site so a new forest can be re-established).

Site Preparation	
BMU Management Strategy: • suppression • holding • salvage • monitor 	**Site preparation** is the removal or treatment of competing vegetation and/or logging debris to prepare the soil for planting or natural regeneration on areas that were affected by the mountain pine beetle
Seedling Acquisition	
BMU Management Strategy: • suppression • holding • salvage • monitor 	**Seedling acquisition** is obtaining, transporting and storing tree seedlings for reforesting areas impacted by the mountain pine beetle.

Reforestation

BMU Management Strategy:

- suppression
- holding
- salvage
- monitor

Reforestation - where areas have been affected by the mountain pine beetle, a stand of trees can be established by either planting seedlings or encouraging natural regeneration, as specified in the treatment prescription.

Brushing and Weeding

BMU Management Strategy:

- suppression
- holding
- salvage
- monitor

Brushing and weeding is controlling competing vegetation that interferes with the growth of the favoured tree species (crop trees) in rehabilitated sites. Vegetation is controlled to allow existing young stands to grow (up to free growing stage).

Minor Access	
BMU Management Strategy: • suppression • holding • salvage • monitor 	**Description:** **Minor road improvements** to allow access for the treatment of mountain pine beetle infestations and to allow access for subsequent silvicultural treatments. Minor improvements include developing access trails, minor road grading and other low cost road improvements to gain access to infected areas in order to carry out required treatments

Other Eligible Activities

Completing a funding proposal application and implementing approved projects under the PFRP will require the assistance of a professional forester.

Assistance can be requested from the PFRP where a landowner is not qualified to complete an application to propose mountain pine beetle treatments. Canadian Forest Service field staff can visit the property to discuss the PFRP and to provide advice on potential PFRP activities.

Where landowners are qualified (i.e. they are a professional forester or have the services of a consulting professional forester) applications to the PFRP describing proposed treatments can be submitted for review and approval.

Implementing approved projects will also require hiring a forestry consultant to supervise and monitor project activities and treatments, carry out environmental assessments where necessary, and ensure appropriate treatment standards and procedures are followed, and ensure that the work is done safely and properly. Implementation is supported by the PFRP as a component of a project.

Note:

Landowners that do not have a forest management plan that is current or a mountain pine beetle strategy for their property should apply for assistance in developing a mountain pine beetle Management Strategy and Report for their forestlands. In most of these cases, a first project proposal to the PFRP, would be to hire a forestry consultant to carry out surveys and prepare the strategy and management report. Subsequent treatments and activities that are proposed should be derived from this management report.

How much funding may be received?

The PFRP will share the costs of eligible projects as follows:

a) Maximum PFRP Contribution:

- 80% of total project costs up to $25 000;

The PFRP will contribute up to 80% of the eligible costs incurred for activities conducted on eligible lands, up to an annual maximum of $25 000 per landowner.

A maximum of up to 10% of the PFRP funds may be used for project management and administration and up to 5% for minor capital items (i.e. field equipment, planting tools, safety gear, etc.).

b) Minimum Landowner Contribution:

- 20% of total project costs;
- cash and/or in-kind.

The landowner must contribute at least 20% of the approved eligible costs. This contribution must be in the form of cash or in-kind (i.e. the PFRP will reimburse up to 80% of the project costs invoiced to the landowner).

In-kind contributions are cash-equivalent contributions that are real and measurable.

Examples of in-kind contributions include labour, supervision, equipment, supplies, office space and materials, management and technical or professional services, etc.

Revenue from merchantable timber accruing from harvesting will be factored into the cost-sharing of the project.

What is not eligible for funding under the PFRP?

Funding through the PFRP is intended to assist owners of non-industrial private land to manage their land to minimize the impact of the mountain pine beetle. While many activities are included under the PFRP umbrella, the following items are not eligible for PFRP funding:

- landowner labour, including surveys, supervision, equipment operation, report writing;[1]
- cost of landowner-owned equipment that is used;
- purchase of non-expendable equipment (pruners, power saws, ATVs, GPS receivers, etc.);[2]
- pesticide treatment programs or activities;
- research activities, including operational trials;[3]
- aerial surveys by helicopter or fixed-wing aircraft;
- purchase of satellite imagery or aerial photography;
- full management plan development, including either initial or updated forest inventories;
- road and bridge construction, reconstruction, or repair, other than as part of 'minor access'; and,
- purchase and use of anti-aggregation semiochemicals.

1 A maximum of 10% of funding may be applied to project administration.

2 A maximum of 5% of funding may be applied to minor capital items.

3 Research interests should be directed to the mountain pine beetle research agenda at http://mpb.cfs.nrcan.gc.ca/research/index_e.html.

Other ineligible activities and expenses include:

- projects that are not related to mountain pine beetle control and forestlands rehabilitation;
- projects that may cause environmental degradation;
- costs relating to developing an application; and,
- expenses incurred before an application is approved and a Contribution Agreement is validated.

Application Process

To apply for funding assistance under the PRFP complete the application contained in these guidelines and submit it to the Canadian Forest Service at the following address:

Natural Resources Canada, Canadian Forest Service
Private Forestlands Rehabilitation Program
506 West Burnside Road
Victoria, BC V8Z 1M5

Attention: Nello Cataldo, Program Manager

Telephone: (250) 363-6014 Fax: (250) 363-0775

Email: ncataldo@pfc.cfs.nrcan.gc.ca

http://mpb.cfs.nrcan.gc.ca

When the application is received a letter acknowledging receipt of the application will be sent to the applicant. Applications will be reviewed and rated according to how well they meet the requirements of the PFRP. Once the application has been evaluated the Canadian Forest Service will notify each applicant by letter as to the outcome of the application. Applications for funding will be accepted on a continuous basis.

The Contribution Agreement

Only fully completed applications will be considered for approval. Once an application is reviewed and approved a Contribution Agreement will be prepared by the Canadian Forest Service. A contribution agreement is a legal document that specifies the terms, conditions, budget, and standards for the activities that will be funded under the PFRP. The agreement outlines the amount of funding being contributed, the responsibilities and the work to be conducted by each party, the terms of payment, the work schedule, and the project's expected results. This document is developed in consultation with the applicant. The Contribution Agreement must be signed and validated by the Canadian Forest Service before work can begin.

Recipient commitment and financial records

Once the application is approved and the contribution agreement is validated, monitoring and supervising the activities of the project to ensure progress and attainment of expected results are the basic obligations of the landowner (agreement recipient). In projects where there is third party involvement, for example by consultants and contractors, financial arrangements and payment for services is also the responsibility of the recipient. It is recommended that service contracts be developed when employing third party services.

In addition, recipients are required to maintain accurate accounts and records relating to expenses incurred and payments made in the course of implementing the project. These accounts and records shall be made available to the Canadian Forest Service upon request for inspection and audit, and should be kept for the duration of the PFRP. The landowner may be required to submit all invoices, payroll records, time sheets, and other records from the project.

The landowner will be responsible for reporting income received and expenses incurred under the PFRP to the Canada Customs and Revenue Agency.

Payment

Once a Contribution Agreement has been issued and validated, payment will be made by the Canadian Forest Service to the recipient using established federal government procedures and the terms of payment outlined in the agreement. Please note that in most cases payment is made upon completion of the work or submission of the deliverable that is specified in the agreement. The recipient is responsible for making payments to contractors, forestry consultants, and others employed by the landowner in carrying out the approved project activities. The recipient is also responsible for providing both the deliverables and substantiation of expenditures for the PFRP funds. PFRP payments can only be made for pre-approved costs that were incurred between start and end dates of the project as specified in the contribution agreement.

To receive payment, the recipient will submit project claims (provided by the Canadian Forest Service) during the term of the contribution agreement according to an agreed payment schedule. Each claim for payment will be accompanied by a written report as specified in the agreement detailing achievements and progress to date. Final project payment will be made based upon claims submitted and work accomplished. The recipient must have completed all the requirements of the contribution agreement to the satisfaction of the Canadian Forest Service, as the implementing agency, and according to the specified treatment standards.

Project inspections and monitoring

On-site field visits will be conducted to ensure that the work is in accordance with the terms and conditions of the PFRP, the accepted Contribution Agreement and the prescription prepared for the recipient's land. Failure to meet the agreed upon conditions may result in suspension or termination of the project(s). Canadian Forest Service field staff or forestry consultants under contract to the PFRP will normally conduct these site visits.

Technical Advisory Committee

Overall management of the PFRP is the responsibility of Natural Resources Canada, Canadian Forest Service. To assist the Canadian Forest Service in implementing the PFRP, direction and support is provided by a Technical Advisory Committee comprised of representatives from the Canadian Forest Service, the provincial government, and woodlot owners organizations. The responsibility of the Technical Advisory Committee is to assist with program promotion, soliciting proposals, recommending projects and assisting with extension activities as required. The committee will meet once or twice per year, or as required, to review the progress of the program, assess the guidelines, and make recommendations for improvements to the program.

Glossary

aerial overview survey	general survey conducted from fixed-wing aircraft to delimit infested areas, track annual changes, and produce an overview sketchmap
Annual Allowable Cut	the level of harvest, as determined by the Chief Forester of BC, permitted from crown land in a given year
anti-aggregation semiochemical	a pheromone that is released by attacking adult mountain pine beetles to signal that a mass-attacked tree cannot support further attacking adults
endemic population	normal population levels of mountain pine beetle that would exist between outbreaks
fader	description of a tree that has been successfully attacked and its foliage is turning a lighter than normal shade of green, prior to turning red; depending upon weather conditions, fader lodgepole pine trees may be evident in the late spring and early summer
frass	insect excrement consisting primarily of macerated phloem
gallery	a vertical groove excavated by the female beetle under the bark of the tree in which eggs are laid; larvae excavate feeding galleries at right angles to the egg gallery

green attack	description of a tree that has been successfully attacked yet retains green foliage; a successfully attacked lodgepole pine tree will normally retain green foliage until late spring of the year following attack
grey attack	description of a tree that has been successfully attacked and has very little foliage remaining; normally a lodgepole pine tree will lose most or all of its foliage three years after attack
grid baiting	technique used to contain emerging beetles, thus preventing spread to adjacent stands, where pheromone baits are placed on a 50-metre grid starting 25 metres inside the perimeter of the stand
hazard	the estimated susceptibility of a stand, once attacked, to bark beetle damage; normally based upon stand species composition, age, density, elevation, latitude and longitude
heavy attack level	used in aerial overview survey mapping to describe a polygon where greater than 29% of the trees show visible signs of recent attack
incipient population	the stage where the beetle numbers exceed the minimum necessary to overcome the resistance of the average large-diameter tree in the stand – often the precursor to an outbreak
light attack level	used in aerial overview survey mapping to describe a polygon where between one and 10% of the trees are visibly recently attacked
moderate attack level	used in aerial overview survey mapping to describe a polygon where between 11 and 29% of the trees show visible signs of recent attack

outbreak population	beetle populations are thriving at the landscape level due to local population expansion and widespread short- and long-range dispersal of attacking adult beetles
overview sketchmapping	mapping conducted from fixed-wing aircraft at a 1: 100 000 or 1: 250 000 scale to delimit infested areas and to track annual changes
patch infestation	an infestation generally of an area greater than one hectare and comprised of more than 100 green attacked trees
pheromone	a chemical produced by an organism which stimulates a specific response by other individuals of the same species; most often, the term is used to describe a chemical that will attract attacking mountain pine beetles, i.e. aggregation pheromone
phloem	inner bark – the pipeline through which food is passed to the rest of the tree
pitch tubes	a combination of boring dust, insect frass, and tree pitch that collects around the entrance hole of an egg gallery as the adult female beetle excavates under the bark
probe	normally a systematic strip-type survey through a stand to obtain detailed information on infestation levels, attack history and other stand data necessary to make management decisions
red attack	description of a tree that has been successfully attacked and its foliage has turned red; normally, a successfully attacked lodgepole pine tree will display red foliage 12 months after attack, and this will last for up to two years

risk	probability that an infestation will occur in a particular stand, generally dependent upon the proximity of a stand to beetle infestations and the susceptibility of the stand
semiochemical	a message-bearing chemical that mediates one or more interactions between organisms
spot baiting	technique used to hold emerging beetles in the immediate area of a small epicentre so that they can be treated with a direct aggressive strategy at a later time
spot infestation	an infestation generally limited to an area of less than one hectare and comprised of less than 100 green attacked trees

Resources

British Columbia Ministry of Forests. In press as of March 2003. Provincial Strategy for Bark Beetle Management. Forest Practices Branch, Victoria, BC. 19 pp.

British Columbia Ministry of Forests. 2000. Strategies and Tactics for Managing the Mountain Pine Beetle Dendroctonus ponderosae. Kamloops Forest Region, Kamloops, BC. 57 pp.

British Columbia Ministry of Forests. 1998. A Socio-economic Analysis of Mountain Pine Beetle Management in British Columbia. Forest Practices Branch, Victoria, BC. 6 pp.

British Columbia Ministry of Forests. 1995. Bark Beetle Management Guidebook. 57 pp. (also at http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/beetle/betletoc.htm

British Columbia Ministry of Forests. 1984. PesTerms. Protection Branch, Victoria, BC, 34 pp.

Canadian Forest Service. 2003. The Mountain Pine Beetle Website.

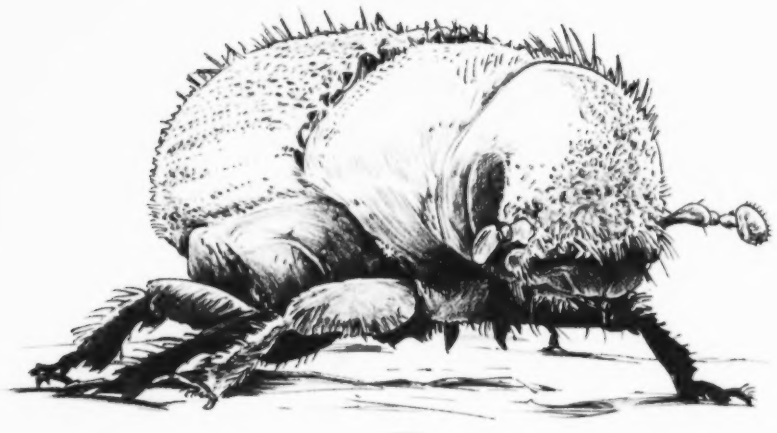
http://www.pfc.cfs.nrcan.gc.ca/entomology/mpb/index_e.html

The Mountain Pine Beetle Initiative

PRIVATE FORESTLANDS REHABILITATION PROGRAM

Funding Application Form

May 2003



1. Introduction

a) Please refer to the *Private Forestlands Rehabilitation Program* (*PFRP*) *Operational Guidelines* before completing the Funding Application Form. The guidelines provide information on the mountain pine beetle and the *PFRP* and describe the procedures for participating in the program.

b) For additional copies of the *Operational Guidelines* or for information on the *PFRP* please contact:

Natural Resources Canada, Canadian Forest Service
Private Forestlands Rehabilitation Program
506 West Burnside Road
Victoria BC V8Z 1M5
Attention: Nello Cataldo, Program Manager
Telephone: (250) 363-6014 Fax: (250) 363-0775
Email: ncataldo@pfc.cfs.nrcan.gc.ca

OR

Natural Resources Canada, Canadian Forest Service
Private Forestlands Rehabilitation Program field staff:

Prince George, B.C.

Attention: Helena Adamowicz, Forestry Liaison Officer
Telephone: (250) 960-5691 Fax: (250) 960-5767
Email: headamow@pfc.cfs.nrcan.gc.ca

Kamloops, B.C.

Attention: Maureen Scott, Forestry Liaison Officer
Telephone: (250) 371-3949 Fax: (250) 371-3714
Email: mascott@pfc.cfs.nrcan.gc.ca

c) Please ensure that your proposal application is legible and is fully completed. Completed applications should be submitted to the Canadian Forest Service in Victoria at the above address.

d) You will receive acknowledgement of receipt of your application. Additional information will be included with the notification.

2. Assistance with the Funding Application Form

Completing a Funding Application Form and implementing approved projects under the *PFRP* will require the assistance of a professional forester.

Assistance can be requested from the *PFRP* where a landowner is not qualified to complete an application to propose mountain pine beetle treatments. Canadian Forest Service field staff can visit the property to discuss the *PFRP* and provide advice on potential *PFRP* activities.

Where landowners are qualified (i.e. they are a professional forester or have the services of a consulting professional forester) applications to the *PFRP* describing proposed treatments can be submitted for review and approval.

Implementing approved projects will also require hiring a forestry consultant to supervise and monitor project activities and treatments, carry out environmental assessments where necessary, ensure appropriate treatment standards and procedures are followed, and ensure that the work is done safely and properly. Implementation is supported by the *PFRP* as a project component.

> ***Note:***
>
> Landowners that do not have a forest management plan that is current or a mountain pine beetle strategy for their property should apply for assistance in developing a mountain pine beetle Management Strategy and Report for their forestlands. In most of these cases a proposal to the *PFRP*, as a first project, would be to hire a forestry consultant to carry out surveys and prepare the Management Strategy and Report. Subsequent treatments and activities that are proposed should be derived from this report.

3. Applicant Information

a) Name of Applicant

Registered name(s) of landowner(s) as appearing on the deed or land title *(please print)*.

_____

_____

_____

Phone: (home) _____ (work) _____

Fax: _____ Email: _____

When more than one person owns the property, one owner may be designated as the representative of all the owners.

Name of applicant representative: _____

_____

_____

_____

Phone: (home) _____ (work) _____

Fax: _____ Email: _____

b) Applicant Mailing Address *(number, street, city, postal code)*

_____

_____

_____

Phone: (home) _____ (work) _____

Fax: _____ Email: _____

c) Legal Property Description *(include as much information as possible - parcel identification number, plan number, section, district number, lot, sub-lot, etc.)*

_____

_____

_____

_____

_____

_____

_____

_____

d) Location of Property and Proof of Ownership *(indicate distance/direction from nearest community and, if possible, include a map showing the property location and direction to it. A copy of the "Certificate of Land Title" confirming that you own this property is also required as part of this application).*

_____

_____

_____

_____

_____

_____

_____

_____

Is map attached? ❑ Yes ❑ No

Is Certificate of Land Title attached? ❑ Yes

4. General Property Information

a. Total area of land owned (1 ha = 2.47 acres) _____ ha

b. Estimated area currently forested _____ ha

c. Are you aware of current mountain pine beetle attack on your property?

❑ Yes ❑ No **If yes**, estimate the size of forest area attacked: _____ ha

d. Estimate, if known, the size of susceptible forest area threatened but not yet attacked: _____ ha

e. Estimate, if known, the distance in kilometers to the nearest infested area from your property: _____ km

f. Has past damage occurred on your property from mountain pine beetle attack?

❑ Yes ❑ No **If yes**, estimate the size of area attacked: _____ ha

g. Is any portion of this private land associated with a provincial Woodlot Licence?

❑ Yes ❑ No If yes, WL # _____

h. Is there a Forest Management Plan for this property? ❑ Yes ❑ No
If yes, date of most recent plan: _____

Plan was prepared by: _____

i. Is the property accessible by road? ❑ Yes ❑ No

j. Additional comments about your property and information related to the mountain pine beetle.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

k. How did you become aware of the *PFRP*?

_____

_____

_____

_____

l. Has a Canadian Forest Service program representative visited the property and provided pre-project consultation and advice? ❑ Yes ❑ No

5. Project Information

a. Do you have a written mountain pine beetle management strategy, or a mountain pine beetle strategy component in a forest manage ment plan, for your property? ❑ Yes ❑ No

If yes, please attach a copy of the relevant forest health information and related maps. **If no**, you could apply to receive funding assistance to retain the services of a professional forester to develop an Mountain Pine Beetle Management Strategy and treatment prescriptions and recommendations for your property.

b. Is the application being made by a qualified individual who has a professional working knowledge of mountain pine beetle management and activities? ❑ Yes ❑ No

If yes, then please provide an explanation of the academic, professional, and/or technical credentials that would qualify you to undertake this work, without outside professional assistance.

6. Project Description

Please provide a brief description of your project *(i.e. what exactly are you going to do; why are you going to do it; what results do you expect by the end of the project; what are you contributing in terms of cash, in-kind, equipment, etc.; and what are you asking the PFRP to pay for)* and complete Table 1.

Table 1. Project Description

BMU-MS[1]	Activity Code[2]	Treatment Block[3]	Units[4]	Unit Cost	Total Cost	Proposed Starting Date	Proposed Completion Date

[1] Select the project area Beetle Management Unit - Management Strategy (BMU-MS):

A. Suppression
B. Holding
C. Salvage
D. Monitor

[2] Select the appropriate Activity Code(s) representing the activity or activities that are being proposed:

1. MPB Management Strategies and/or Reports
2. Ground Surveys
3. Treatment Surveys and Prescriptions
4. Sanitation Harvesting
5. Salvage Harvesting
6. Fall and Burn
7. Debarking
8. Beetle Proofing - partial cutting
9. Pheromone Acquisition
10. Pheromone Baiting
11. Site Preparation
12. seedling Acquisition
13. Reforestation
14. Brushing and Weeding
15. Minor Access Improvements

[3] Identify, if known the name of the Treatment Block or polygon where the project activities will take place (i.e. Polygon 1, Polygon 2, Block 1, Block 2, Block A, Block B, etc.).

[4] State the Units or treatment block size (i.e. total number of hectares, kilometers, number of trees, number of traps).

7. Proposed Activity Details

The purpose of completing this section is to provide additional information on the specific activity or activities that are being proposed (*complete pertinent tables only*). Using one or two lines, briefly explain what the specific activity or activities include (*leave sections blank which do not apply*).

Table 2.1 Mountain pine beetle (MPB) Management Strategies and/or Reports

Treatment Block	**Type of Report** *(i.e. MPB strategies, treatment prescriptions, forest management plan MPB update)*	**BMU-MS**	**Area** *(ha)*

Table 2.2 Ground surveys

Treatment Block	**Type of Survey** *(i.e. walk-through or line transects to assess presence of beetles, and beetle probes, to assess extent and degree of attack)*	**BMU-MS**	**Area** *(ha)*

Table 2.3 Treatment Surveys and Prescriptions

Treatment Block	**Type of Survey** *(i.e. silviculture surveys and prescriptions to rehabilitate areas)*	**BMU-MS**	**Area** *(ha)*

Table 2.4 Sanitation Harvesting

Treatment Block	**Treatment Method** *(i.e. single trees, groups of currently infested trees, or susceptible trees are removed to control the spread)*	**BMU-MS**	**Est. # of trees**	**Area** *(ha)*

Table 2.5 Salvage Harvesting

Treatment Block	**Treatment Method** *(i.e. cleaning an area of old attack, removing dead, dying or deteriorated trees, and preparing for rehabilitating a site)*	**BMU-MS**	**Est. # of trees**	**Area** *(ha)*

Table 2.6 Fall and Burn and Debarking

Treatment Block	**Treatment Method** *(i.e. falling, bucking, piling, and burning infested lodgepole pine; peeling bark on infested standing trees; falling and debarking)*	**BMU-MS**	**Est. # of trees**	**Area** *(ha)*

Table 2.7 Beetle Proofing (partial cutting)

Treatment Block	**Intertree Spacing** *(m)*	**Target Density** *(trees/ha)*	**Density Range (trees/ha)**	**Crop Tree Species** *(in order of preference)*	**BMU-MS**	**Area** *(ha)*

Table 2.8 Pheromone Acquisition

Treatment Block	**Product Type/Name**	**Total # of Baits**	**BMU-MS**	**Area** *(ha)*

Table 2.9 Pheromone Baiting

Treatment Block	**Treatment Method** *(i.e. spot baiting, grid baiting)*	**Total # of Baits**	**Dates**		**Eradication Method** *(i.e. harvesting, fall and burn, single tree removal)*	**BMU-MS**	**Area** *(ha)*
			Placement	**Removal**			

Table 2.10 Site Preparation

Treatment Block	**Method of Site Preparation** *(i.e. name type of site preparation - scarification, disc trenching, etc.; name equipment used to remove competing vegetation to prepare a site for reforestation, natural regeneration, or planting)*	**BMU-MS**	**Area** *(ha)*

Table 2.11 Seedling Acquisition

Treatment Block	Area *(ha)*	Tree Species[1]	Stock Type	Trees *(000's)*

[1] Tree Species: e.g. Pl = lodgepole pine Py = ponderosa pine Fd = Douglas-fir, etc.

Table 2.12 Reforestation (Planting)

Treatment Block	Area *(ha)*	Plantable Spots	Tree Species	Stock Type	Trees *(000's)*	Target Stocking	Intertree spacing *(m)*	Screefing *(m)*

Table 2.13 Brushing and Weeding

Treatment Block	**Year of Planting**	**Tree Species Planted**	**Area** *(ha)*	**Treatment Method** *(i.e. brushsaw, sandvik, machete, etc.)*

Table 2.14 Minor Access *(minor road improvements)*

Treatment Block	**Activity** *(trails, brush out road, road grades, etc. in order to access treatment block)*	**Length** *(km)*

8. Project Budget Summary

Please fill out Table 3 to provide an estimate of the budget required to implement your project.

Table 3. Project Budget Summary

Expenses	***PFRP* Program**	**Applicant Cash**	**Applicant In-Kind**	**Other Sources** *(if applicable)*	**Total Cost**
Administration *(up to 10%)*					
Treatment Costs *(from Table 1)*					
Implementation *(Management/ Professional Services)*					
Minor Capital Items *(up to 5%)*					
Totals:					

Note:

- The minimum landowner contribution is 20% of the total project cost, which may be in the form of cash and/or in-kind (cash-equivalent) contributions.
- If other sources of funding are contributing to your project, please complete the following:

Are these funds confirmed? ❑ Yes ❑ No

What is/are the source(s) of these funds? _____

_____

_____

_____

Is this contribution: ❑ Cash and/or ❑ In-kind

If there are minor capital items involved, please complete the following:

Item(s)	# of Items	Cost per Item	Total Cost

9. Applicant Signature Block

_____ _____

(Signature of Landowner) *(Print Name)*

_____ _____

(Position/Title) *(Date)*